

Facility Maintenance Management Competency 4.9

Competency 4.9 Facility maintenance management personnel shall demonstrate the ability to perform project management duties as required to provide facility maintenance management technical support to a project.

1. Supporting Knowledge and Skills

- a. Support the preparation of a Project Execution Plan.
- b. Evaluate a Work Breakdown Structure (WBS).
- c. Evaluate a project's critical path schedule.
- d. Using the results from an analysis of contractor noncompliance, determine the potential implications and describe how to communicate the results to contractor and Department management.

2. Self-Study Activities (Corresponding to the Intent of the Above Competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	http://wastenot.inel.gov/cted/stdguido.html	DOE Standards, Guides, and Orders
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Read DOE N 4700.5, *Project Control System Guidelines*, Attachment 1, Definitions, and Attachment 2, Project Control System Guidelines.

Read DOE Order 4700.1, *Project Management System*, Attachment 3, Definitions, Attachment II-2, Guidance for Preparing a Project Plan, Attachment II-4, Guidance for Preparing a Project Management Plan, and Chapter II Part B, Work Breakdown Structure.

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Read DOE Order 4330.4B, *Maintenance Management Program*, Chapters I and II. These two Orders--4700.1 and 4330.4B--will be phased out upon the incorporation of their contents into contracts or other agreements. They are presented here because their general content remains applicable.

Scan DOE O 430.1, *Life-Cycle Asset Management*, Section 6, Requirements.

Scan any comprehensive text on project management systems and techniques, such as *A Guide to the Project Management Body of Knowledge*, Project Management Institute Standards Committee, 1996. This document can be downloaded (in .pdf format) from the web site, <http://www.pmi.org/>

- EXERCISE 4.9-A Referring to DOE Order 4700.1, *Project Management System*, Attachment II-2, Guidance for Preparing a Project Plan, describe seven of the nine key components of the project execution plan.
- EXERCISE 4.9-B Conferring as necessary with your supervisor, prepare a rough outline or sketch of those components (of the project execution plan that apply to your job duties) for a hypothetical or an actual project in your division.
- EXERCISE 4.9-C For a given project work breakdown structure, assess its merit in terms of (1) applicability to the project goal and objectives, and (2) effectiveness in achieving the project goal and objectives. As necessary, refer to DOE Order 4700.1, *Project Management System*, Chapter II, Part B, Work Breakdown Structure.
- EXERCISE 4.9-D For a given project's critical path, assess its merit in terms of (1) applicability to the project goal and objectives, and (2) effectiveness in achieving the project goal and objectives. As necessary, refer to DOE Order 4700.1, *Project Management System*, Attachment II-2, Guidance for Preparing a Project Plan, and DOE Order 4330.4B, *Maintenance Management Program*, Chapters I and II.
- EXERCISE 4.9-E Using the results from an analysis of contractor noncompliance, determine the potential implications and describe how to communicate the results to contractor and Department management.

3. Summary

Project management is a management approach in which authority and responsibility for execution are vested in a single individual, who applies the knowledge, skills, tools, and techniques to a project's activities in order to meet or exceed stakeholder needs and expectations from a project.¹ This approach provides focus on the planning, organization, direction, and control of all activities within the project. The project management plan is the document that sets forth the plans, organization, and systems that are used by those responsible for managing the project. Similarly, the project execution plan is the document that is used to:

- Guide the execution or carrying out the project
- Acknowledge the project-planning assumptions, alternatives, and decisions
- Facilitate communication among the principals
- Define key management reviews as to content, extent, and timing
- Provide a baseline for progress measurement and project control²

A cornerstone of DOE's project management policy is the concept of accountability at appropriate levels for project control and management. An essential element of accountability is overall project control of technical scope, cost, and schedule baselines. The three major categories in the project control system are baseline development, project performance, and change management.

Baseline development includes management actions necessary to define the project scope and responsibilities, establish baselines, and plan the project. It encompasses:

- Technical baseline, work-scope definition, and work breakdown structure
- Roles and responsibilities
- Cost estimating
- Planning and scheduling (for example, critical path identification)
- Obligation/cost baseline

Project performance includes management actions after work commences that are necessary to monitor project status, report and analyze performance, and manage risk. It encompasses:

- Funds control management
- Accounting
- Work authorization
- Performance analysis (for example, assessment of critical path effectiveness or determination of noncompliance)
- Reporting
- Change control process

¹A Guide to the Project Management Body of Knowledge, page 167.

²*Ibid.*, pages 40-41.

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Change management includes management actions necessary to ensure adequate control of project baselines, including the performance measurement baseline. It encompasses:

- Clearly defined and DOE-approved baselines
- Defined, documented, and approved baseline changes and thresholds
- Decision-making at appropriate management level
- Retroactive changes
- Change processing time frames
- Replanning coordination

4. Exercise Solutions

(Any reasonable paraphrase of the following is acceptable.)

EXERCISE 4.9-A Referring to DOE Order 4700.1, *Project Management System*, Attachment II-2, Guidance for Preparing a Project Plan, describe seven of the nine key components of the project execution plan.

ANSWER 4.9-A Any seven are acceptable.

KEY COMPONENTS OF THE PROJECT EXECUTION PLAN	
Component	Description
1. Mission Need and Objectives	This section provides a summary of the approved mission need with regard to the required capability to be achieved and outlines technical, resource, and schedule objectives and projections.
2. Technical Plan	This section should describe what is going to be done and how it shall be accomplished.
3. Risk Assessment	This section is an assessment of project risks (as identified critical systems, subsystems, and other factors which require focused work and resolution), and include technical, schedule, cost, safeguards and security, loan guarantee, environmental, health, safety, regulatory, utility, and institutional impediments.
4. Management Approach	This section addresses the organizational responsibilities, decision delegations, other management arrangements, and management control systems under which the project shall be carried out. Emphasis is placed on the extent of the project manager's responsibility for total project funds control, costs, commitments, and work efforts.

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KEY COMPONENTS OF THE PROJECT EXECUTION PLAN	
Component	Description
5. Acquisition Strategy	The acquisition strategy is the underlying conceptual basis for management of a project; reflects the interrelationship of its mission, technical, business, and management objectives; and describes the approach that shall be used for acquiring the major items of hardware, software, and management support.
6. Project Schedule	This section should be a one-paragraph statement that refers to the project schedule as an attachment. It should also include any qualifying statements. The schedule attachment must reflect the project work breakdown structure (WBS) elements.
7. Resources Plan	This section, as an attachment, indicates the projected total manpower (DOE, contractor, and other personnel); life cycle cost considerations, such as energy-efficient new building design features, and selection of the most cost-effective utility services to meet program requirements.
8. Controlled Baselines	The controlled baselines are cost, schedule, and technical scope.
9. Project Charter	The project charter can be prepared and approved prior to the preparation of the project plan but should be included as part of the plan. The project charter clearly delineates management responsibility, authority, and accountability for the project. It establishes the operational management relationships between Headquarters and field project management organizations.

EXERCISE 4.9-B Conferring as necessary with your supervisor, prepare a rough outline or sketch of those components (of the project execution plan that apply to your job duties) for a hypothetical or an actual project in your division.

ANSWER 4.9-B The answer will be an adaptation and personalization of the components noted in answer 4.9-A above.

EXERCISE 4.9-C For a given project work breakdown structure, assess its merit in terms of (1) applicability to the project goal and objectives, and (2) effectiveness in achieving the project goal and objectives. As necessary, refer to DOE Order 4700.1, *Project Management System*, Chapter II, Part B, Work Breakdown Structure.

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ANSWER 4.9-C The answer will be based on the results of the assessment and should reflect how well the WBS addresses the following issues:

WBS ASSESSMENT ISSUES	
Issue	Description
(1) Applicability	The WBS technique provides a formal structure that identifies all the products and relates all the work effort required to meet the project objective. By breaking the total product and effort into successively smaller entities, DOE can ensure that all required products are identified to the WBS (and hence, charged to the effort) and actually contribute to the work objective.
(2) Effectiveness	<ul style="list-style-type: none">• The information derived from WBS performance reporting and projections can assist in establishing, justifying, and allocating project funds for the next and future fiscal years (the entire project). Since the work and cost content, management priority, and status of each WBS element are defined, a baseline exists for planning, controlling, and accounting for project funds.• The WBS technique provides a systematic approach to cost estimating that ensures relevant costs are not omitted. An estimate derived by WBS elements helps the Departmental project manager to monitor, coordinate, and control the various project activities that DOE and the contractors are conducting.• The WBS provides a framework for collecting schedule information by WBS elements to establish overall and detailed schedules. The impact of schedule changes may be readily assessed when a WBS is used because each element's start and completion date is integrated with the other elements' schedules. This allows expedited review and approval by the Department of contractor proposed schedule changes.• The WBS technique accomplishes the objective of work definition and provides the basis for performance measurement with a product orientation. It also facilitates work measurement at levels which meet specific management needs.• Configuration management is the task of managing, controlling, and reporting the planned and actual design of the physical characteristics of items throughout their intended life.

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EXERCISE 4.9-D For a given project's critical path, assess its merit in terms of (1) applicability to the project goal and objectives, and (2) effectiveness in achieving the project goal and objectives. As necessary, refer to DOE Order 4700.1, *Project Management System*, Attachment II-2, Guidance for Preparing a Project Plan; and DOE Order 4330.4B, *Maintenance Management Program*, Chapters I and II.

ANSWER 4.9-D The answer will be based on the results of the assessment and should reflect how well the project's critical path addresses the following issues:

- (1) Applicability: During the entire process of scheduling, the use of logic diagrams can be extremely helpful to the planner or scheduler to recognize the relationships between the various actions required on a particular project. It must be recognized that perhaps the largest benefit from the use of the performance evaluation review technique (PERT) or critical path method (CPM) can be gained during the early phases of project design. Design decisions and regulatory requirements during the design phase may create considerable changes to the project logic. In some cases, a design or other decisions may have such an effect on the project cost and schedule to require a modification or reversal of the decision. For this reason, the project manager must continually revise and utilize the logic diagram. In other words, the critical path will generally change from time to time as activities are completed ahead of or behind schedule. Although normally calculated for the entire project, the critical path can be determined for a milestone or subproject. Still, the critical path must be traceable to and lead to achievement of the project objectives.
- (2) Effectiveness: The effectiveness of the designated critical path is directly related to how well the schedule is controlled. "Schedule control is concerned with (a) influencing the factors which create schedule changes to ensure that changes are beneficial, (b) determining that the schedule has changed, and (c) managing the actual changes when and as they occur."

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EXERCISE 4.9-E Using the results from an analysis of contractor noncompliance, determine the potential implications and describe how to communicate the results to contractor and Department management.

ANSWER 4.9-E Consult with your supervisor and site subject-matter expert for the appropriate answer.